CITY OF KENDRICK (PWS 2290019)
SOURCE WATER ASSESSMENT FINAL REPORT

April 11, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated source water assessment area and sensitivity factors associated with the well and aquifer characteristics.

This report, *Source Water Assessment for City of Kendrick, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

City of Kendrick drinking water system consists of three active groundwater wells and one active spring. The system currently serves approximately 325 people through 211 connections.

Final susceptibility scores are derived from equally weighing system construction scores, hydrologic sensitivity scores (wells only), and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential Contaminants/Land Uses are divided into four categories, inorganic contaminants (IOCs, i.e. nitrates, arsenic), volatile organic contaminants (VOCs, i.e. petroleum products), synthetic organic contaminants (SOCs, i.e. pesticides), and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of total susceptibility, Well #1 rated high for IOCs, VOCs, SOCs, and microbials. System construction rated moderate and hydrologic sensitivity rated high for the well. Land use rated moderate for IOCs, VOCs, SOCs, and low for microbials.

In terms of total susceptibility, Well #2 rated automatically high for IOCs, VOCs, SOCs, and microbials. System construction rated moderate and hydrologic sensitivity rated high for the well. Land use rated low for IOCs, VOCs, SOCs, and microbials. The automatically high ratings are due to the ground water under direct influence (GWUDI) field survey noting that a road, a storage building, a clothing store, and a carpet store exist within the 50 foot sanitary setback distance of the well.

In terms of total susceptibility, Well #4 rated moderate for IOCs, automatically high for VOCs, and moderate for SOCs and microbials. System construction rated moderate and hydrologic sensitivity rated high for the well. Land use rated low for IOCs and VOCs, moderate for SOCs, and low for microbials.

In terms of total susceptibility, Stanton Spring rated high for IOCs and SOCs, and moderate for VOCs and microbial bacteria. System construction rated moderate and land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials.

No SOCs or repeat tests of microbials have ever been detected in the wells or spring. The VOC toluene was detected once in Well #4 (February 1998), and the disinfection byproduct, dichloromethane was detected once in both Well #1 and Well #4 (December 1999). Trace concentrations of the IOCs calcium, chloride, copper, fluoride, iron, magnesium, nitrate, potassium, silica, sodium, and sulfate have been detected in tested water. Latah county is considered to have medium nitrogen fertilizer usage, high herbicide usage, and high agricultural chemical usage.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Kendrick, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Actions should be taken to keep a 50-foot radius circle clear of all potential contaminants from around the wellheads and 100 feet around the spring. Any contaminant spills within the delineations should be carefully monitored and dealt with. As much of the designated protection areas are outside the direct jurisdiction of the City of Kendrick, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection. In addition, the well should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. For assistance in developing protection strategies please contact the Lewiston Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CITY OF KENDRICK, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the rankings of this assessment mean.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment is also included.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The local community, based on its own needs and limitations, should determine the decision as to the amount and types of information necessary to develop a drinking water protection program. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

City of Kendrick drinking water system consists of three active groundwater wells and one active spring. The system currently serves approximately 325 people through 211 connections.

No SOCs or repeat tests of microbials have ever been detected in the wells or spring. The VOC toluene was detected once in Well #4 (February 1998), and the disinfection byproduct, dichloromethane was detected once in both Well #1 and Well #4 (December 1999). Trace concentrations of the IOCs calcium, chloride, copper, fluoride, iron, magnesium, nitrate, potassium, silica, sodium, and sulfate have been detected in tested water. Latah county is considered to have medium nitrogen fertilizer usage, high herbicide usage, and high agricultural chemical usage.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with the University of Idaho to perform the delineations using a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the aquifer of the Clearwater Uplands in the vicinity of the City of Kendrick wells. The computer model used site specific data, assimilated by the University of Idaho from a variety of sources including operator input, local area well logs, and hydrogeologic reports (detailed below).

Hydrogeologic Setting

The town of Kendrick is located in the northern margin of the Clearwater Embayment – the easternmost extent of the Columbia River Basalt Group (CRBG). The area is underlain by pre-Tertiary, crystalline, basement rocks. Surficial sediments of the Palouse Loess and more recent alluvium cover the basalt in most of the area.

The CRBG forms the major aquifers in the area with well yields above 100 gallons per minute (gpm). Fractures in the basement rock, which are encountered approximately 600 ft. below ground in the town of Juliaetta provide some water. However, this unit has a low hydraulic conductivity and wells exclusively in basement rock usually produce less than 5 gpm. The shallow depth to basement rock, which limits the thickness of the CRBG in Juliaetta is attributed to a ridge of basement rock (Smith, 1984).

The conceptual hydrogeologic model is based on interpretations presented in Smith (1984) for the town of Juliaetta, Ralston (1994) for the town of Kendrick, available well logs, and published geologic maps for the area. Bedrock geology is based on the geologic map of the Pullman quadrangle at a scale of 1:250,000 (Rember and Bennett, 1979).

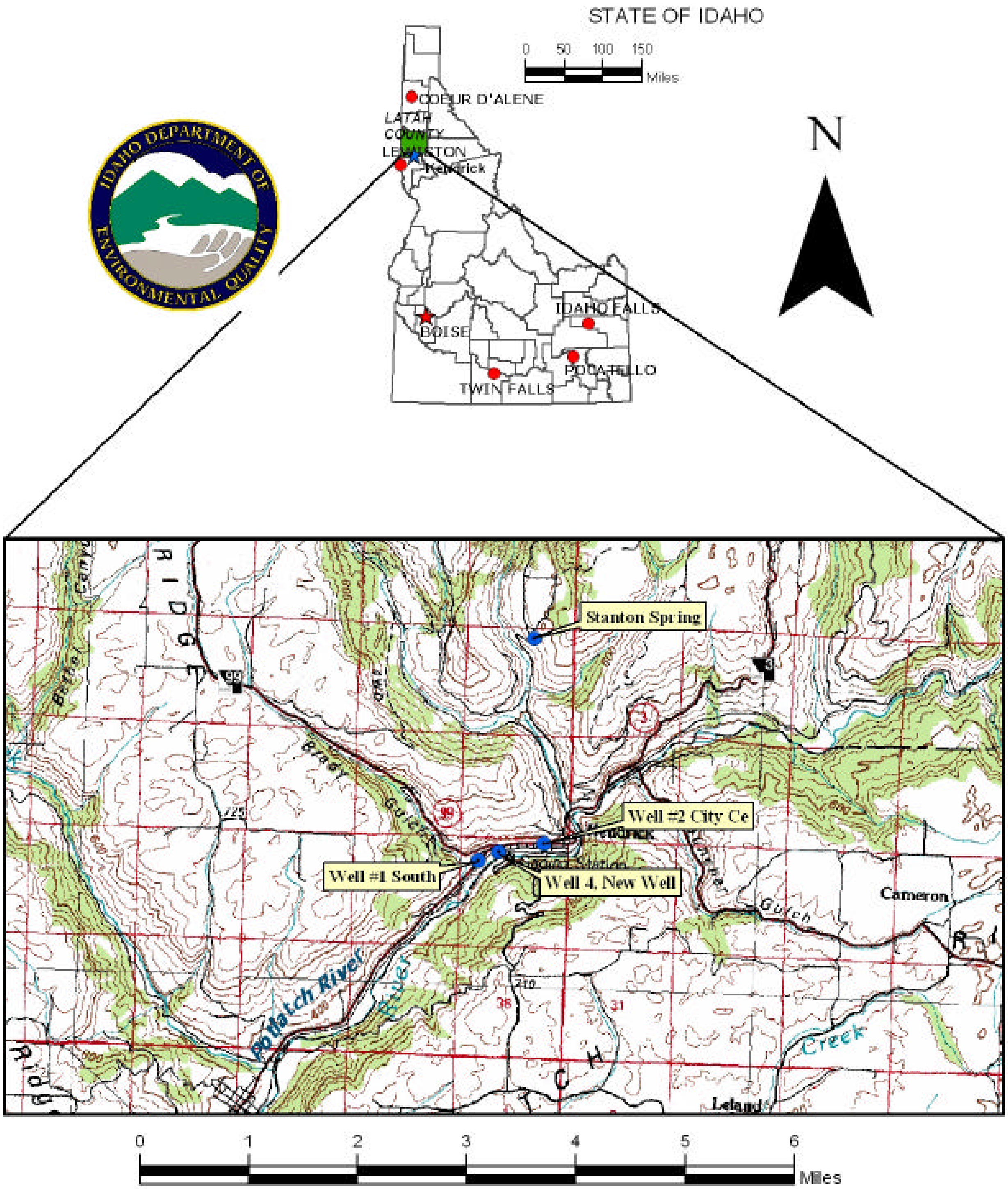
All three wells and the spring appear to draw their water from the Grande Ronde Formation of the CRBG. Based on elevation and stratigraphy, the sources are located in the lower basalt aquifer of the Grande Ronde (Smith 1984). Static water level data for the source wells are scarce; however, the available data indicate that static water levels are close to that of the Potlatch Ricer, with deeper wells showing an increasing head with depth. The elevation of the river is approximately 1200 ft in Kendrick.

Kendrick wells were modeled together using WhAEM. The Stanton Spring was modeled separately in WhAEM, but the capture zones were drawn much larger to include the watershed analysis based on the topography.

Neighboring private wells were used for test points. Information on test points was obtained from a search of the Idaho Department of Water Resources database available on the internet. The locations of the test points are limited to information supplied on the well logs, typically the quarter-quarter section. Therefore, the accuracy of the test point elevation and the static water elevation is dependent upon the accuracy of the driller's log and the relief in the quarter-quarter section.

The delineated source water assessment areas for the wells can best be described as northwest trending corridors 0.3 to 0.5 miles long and 0.2 to 0.3 miles wide. Stanton Spring's delineation is best described as a northeast trending sector approximately 4 miles long which widens to approximately 2.5 miles. The actual data used by the University of Idaho in determining the source water assessment delineation areas is available from DEQ upon request.

FIGURE 1- GEOGRAPHIC LOCATION OF KENDRICK CITY OF WELL #2 CITY CE, STANTON SPRING, WELL #1 SOUTH, WELL 4,NEW WELL, PWS 2290019



Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the immediate area and the surrounding area of the City of Kendrick sources contains some urban activity, however most of the delineation exists within undeveloped range land or woodland uphill of the wellheads. Land use within the spring's delineation contains a high percentage of undetermined agricultural uses.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in July and August 2002. The first phase involved identifying and documenting potential contaminant sources within the City of Kendrick source water assessment areas (Figure 2, 3, 4, 5, and Table 1, 2, 3, 4) through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ.

The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the area. No additional potential contaminant sources within the delineations were identified by the system's operator.

The delineated source water assessment areas of the City of Kendrick wells contain one active and two historical underground storage tanks (USTs), an above ground storage tank (AST), a superfund authorization recovery act (SARA) site, a gravel pit, and a limestone mine. In addition, Burlington Northern Railroad, Brady Gulch, Highway 3, Highway 99, Big Bear Creek, and a county road cross at least one of the delineations. These sources can contribute leachable contaminants to the aquifer in the event of an accidental spill, release, or flood.

Table 1. City of Kendrick, Well #1, Potential Contaminant/Land Use Inventory.

Site	Description of Source[1]	TOT[2] Zone	Source of Information	Potential Contaminants[3]
1, 2	SARA site, UST site; open	0-3 YR	Database Search	VOC, SOC
	Burlington Northern Railroad	0-3 YR	GIS Map	IOC, VOC, SOC, Microbial
	Highway 99	0-3 YR	GIS Map	IOC, VOC, SOC, Microbial
	Highway 3	0-3 YR	GIS Map	IOC, VOC, SOC, Microbial

[1] SARA = superfund authorization recovery act; UST = underground storage tank
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 2. City of Kendrick, Well #7, Potential Contaminant/Land Use Inventory.

Site	Description of Source[1]	TOT[2] Zone	Source of Information	Potential Contaminants[3]
1	UST site; historical	0-3 YR	Database Search	VOC, SOC
	Highway 3	0-3 YR	GIS Map	IOC, VOC, SOC, Microbial

[1] UST = underground storage tank
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 3. City of Kendrick, Well #9, Potential Contaminant/Land Use Inventory.

Site	Description of Source[1]	TOT[2] Zone	Source of Information	Potential Contaminants[3]
1	UST site; historical	0-3 YR	Database Search	VOC, SOC
2	AST	0-3 YR	Database search	VOC, SOC
	Burlington Northern Railroad	0-3 YR	GIS Map	IOC, VOC, SOC, Microbial
	Highway 3	0-3 YR	GIS Map	IOC, VOC, SOC, Microbial

[1] UST = underground storage tank
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 4. City of Kendrick, Cox Spring, Potential Contaminant/Land Use Inventory.

Site	Description of Source	TOT[2] Zone	Source of Information	Potential Contaminants[3]
1	Gravel Pit	3-6 YR	Database Search	VOC, SOC
2	Limestone Mine	3-6 YR	Database search	VOC, SOC
	Big Bear Creek	0-10 YR	GIS Map	IOC, VOC, SOC, Microbial
	County Road	3-10 YR	GIS Map	IOC, VOC, SOC

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

FIGURE 2 - City of KendrickDelineation Map and Potential Contaminant Source Locations

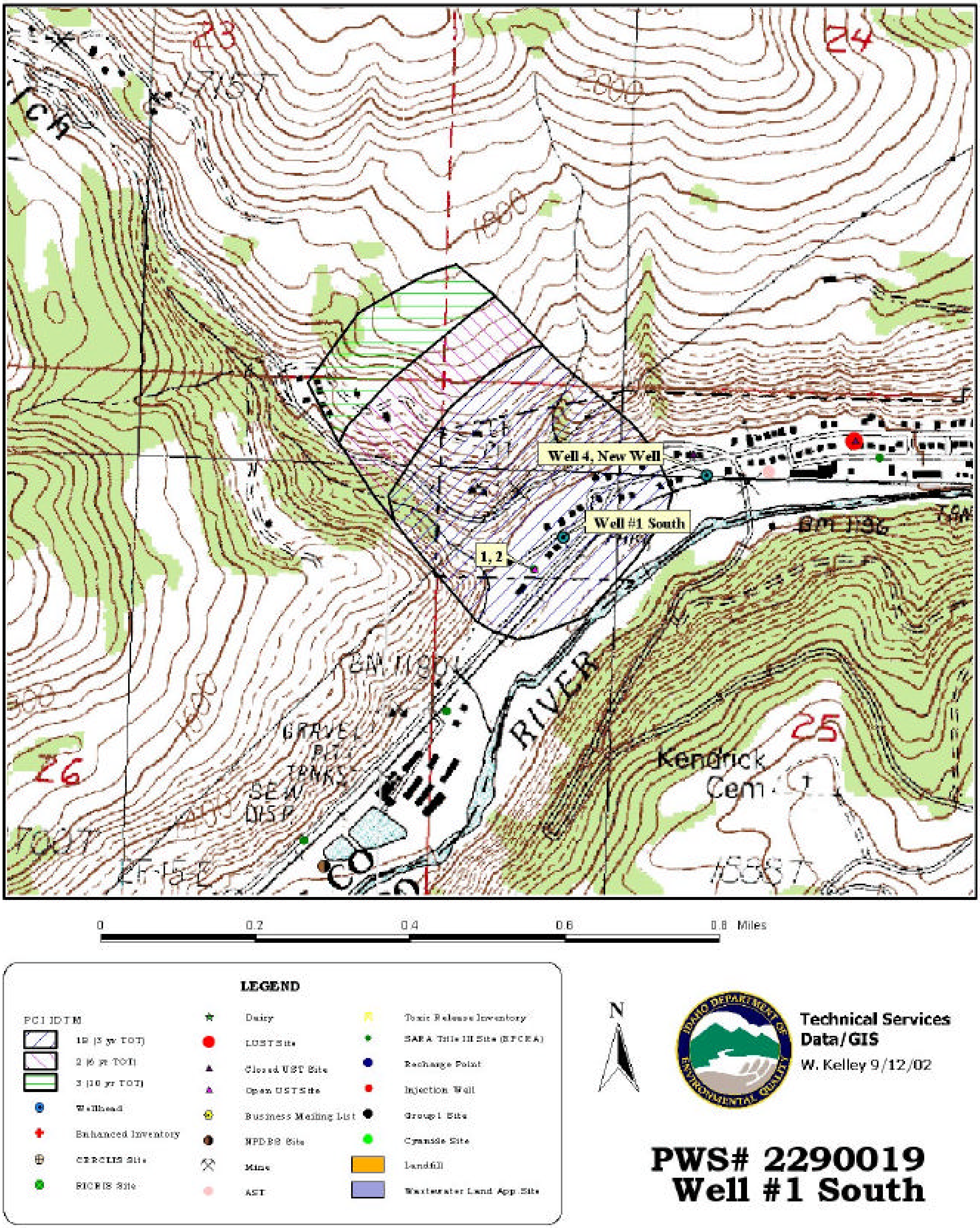
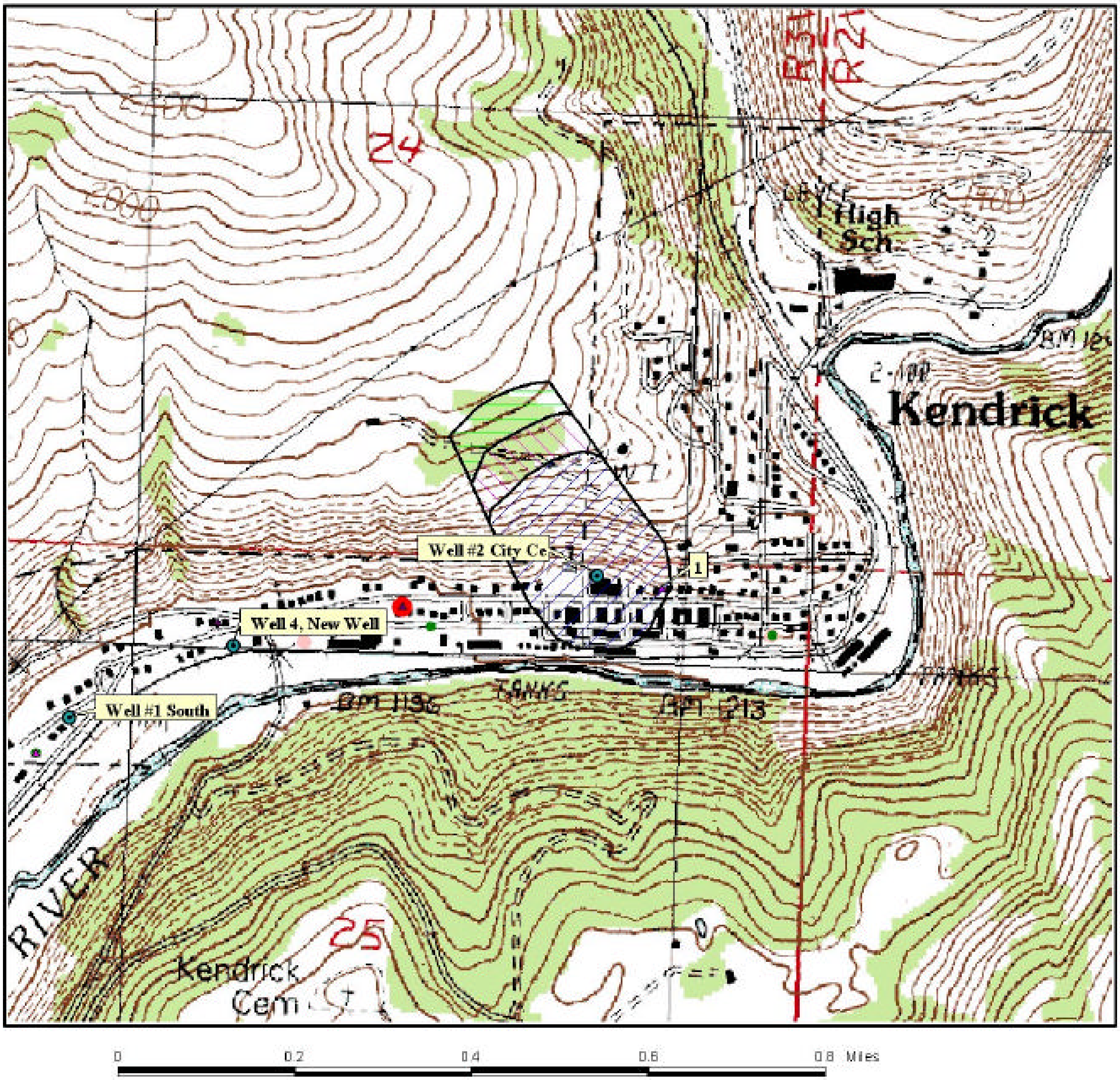
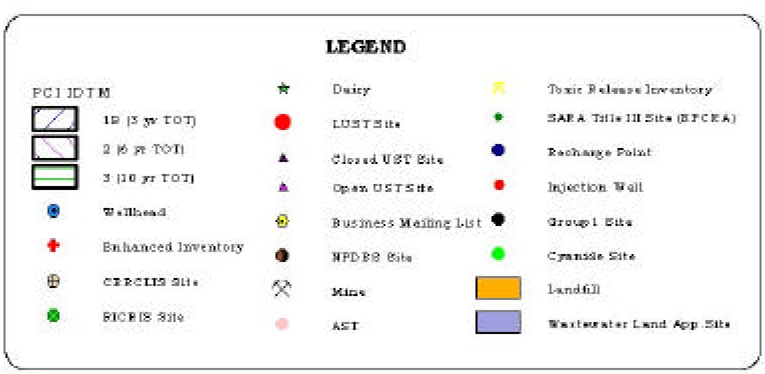


FIGURE 3 - City of Kendrick Delineation Map and Potential Contaminant Source Locations





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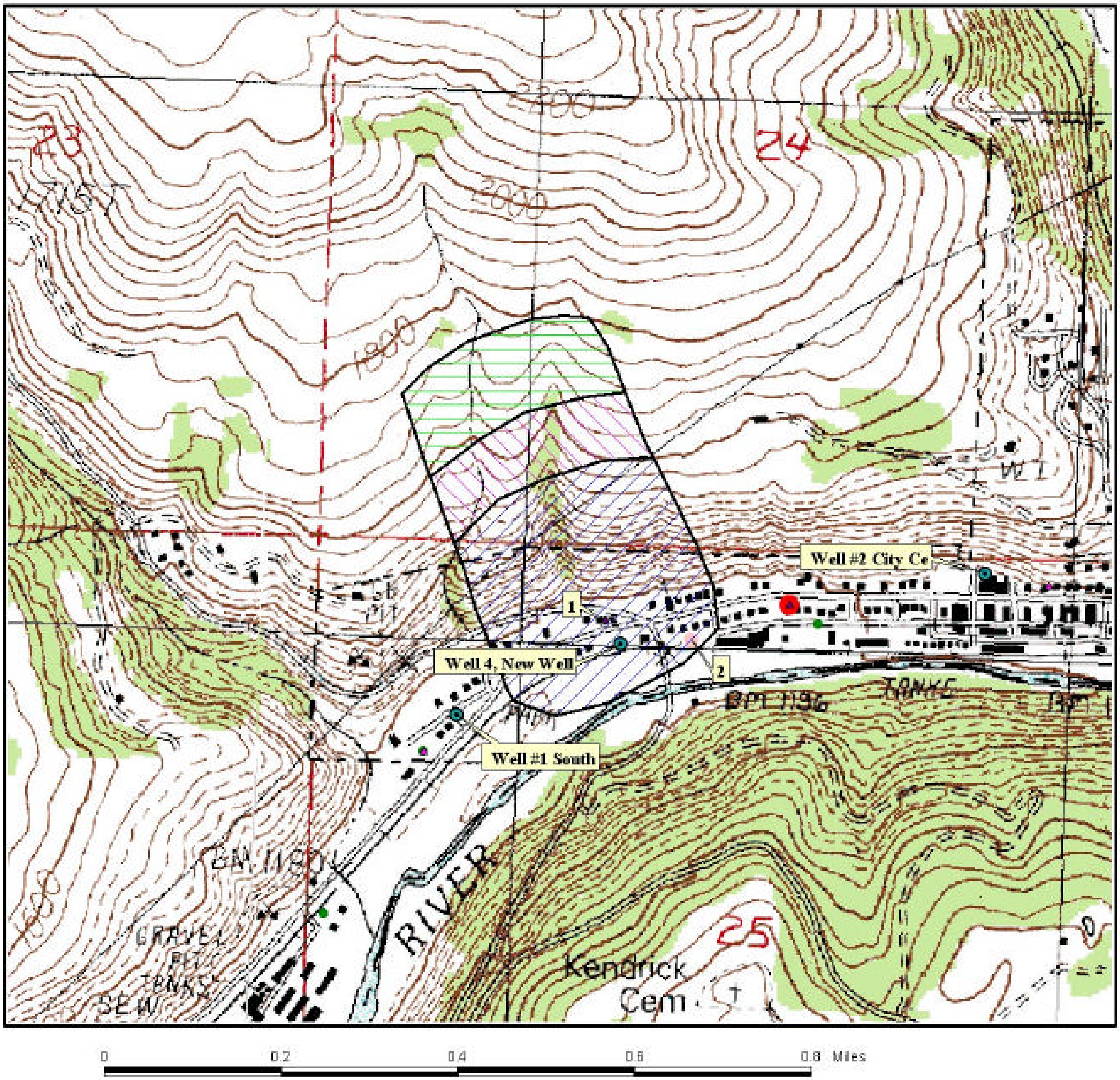
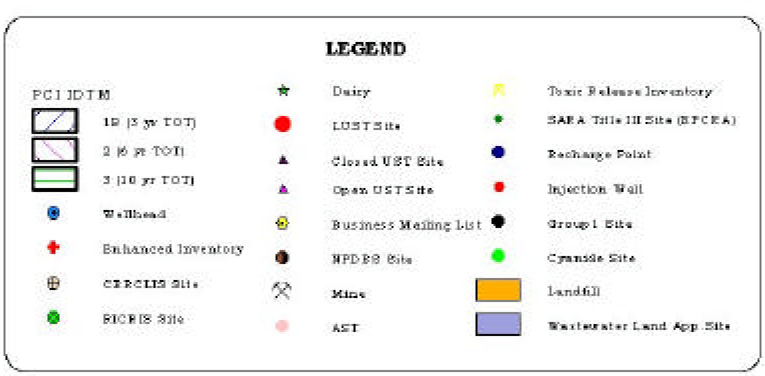
W. Kelley 9/12/02

PWS# 2290019
Well #2 City Ce

FIGURE 4 - City of Kendrick Delineation Map and Potential Contaminant Source Locations





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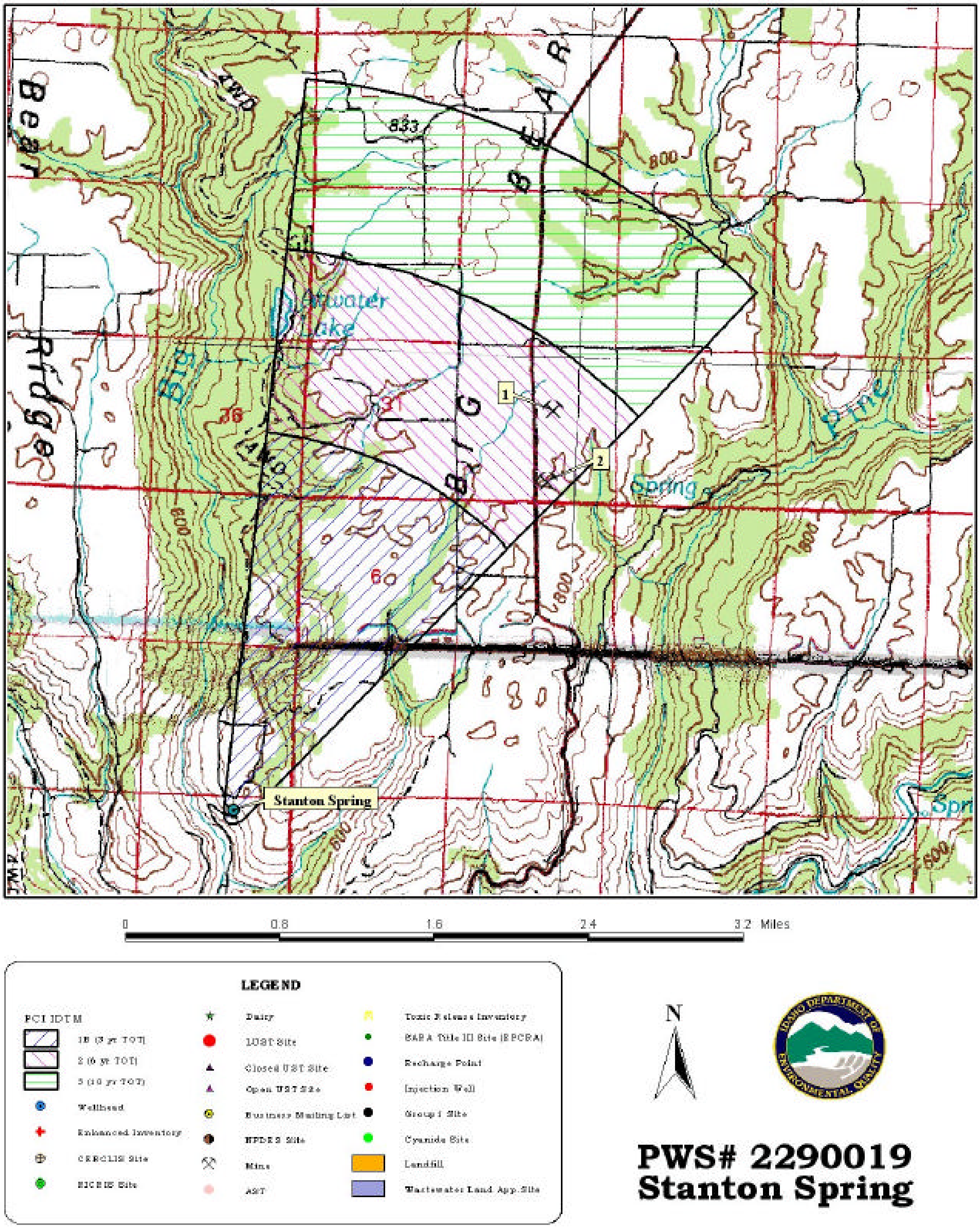
PWS# 2290019
Well #4, New Well

FIGURE 5 - City of Kendrick Delineation Map and Potential Contaminant Source Locations



Section 3. Susceptibility Analyses

Each well or spring's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well or spring is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheets for the system. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination. Hydrologic sensitivity is not included as part of a spring's rating.

Hydrologic sensitivity rated high for Well #1, Well #2, and Well #4. The soil surrounding the wells is considered moderately to well drained, according to the National Resource Conservation Service (NRCS). No well log was available for Well #1 or Well #2, so it is unknown if either well's vadose zone has predominantly permeable constituents, if either well's water table is less than 300 feet deep, or if either well has an aquitard. A well log was available for Well #4. Well #4's vadose zone is predominantly overburden and soil, it's water table is only 4 feet deep, and an aquitard is not present above the producing zone of the well.

System Construction

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced. A sanitary survey was conducted in 2002 for the system, however, well logs for all the sources were not available during this analysis. For rating purposes, unknown information receives a higher, more conservative score.

Well #1 rated high for construction. No well log was available for the well, however, the 2002 sanitary survey noted that this well is 174 feet deep and has been producing since 1960. The well is located outside of a 100 year floodplain. The sanitary survey did note the presence of a sample tap, flow meter, check valve, gate valve, and pressure guage. Because of a missing well log, it is unknown if the casing and annular seal extend into low permeability units, or if the highest production of water comes from more than 100 feet below static water levels.

Well #2 also rated high for construction. The well's construction date is unknown, however, the 2002 sanitary survey noted this 480 foot deep well is the system's oldest developed source and was once artesian. The well is located outside of the 100 year floodplain. Because a well log was not available during this analysis, and the sanitary survey gave a vague description of this wellhead, it is unknown if the casing and annular seal extend into low permeability units, if the highest production of water comes from more than 100 feet below static water levels, or if the wellhead and surface seal are maintained.

Well #4 rated moderate for construction.   A well log for this well noted that the well was drilled in 1998 to a depth of 180 feet below ground surface (bgs). A 10-inch in diameter 0.20 inch thick casing was placed to 51 feet bgs into hard black basalt, and an 8-inch in diameter 0.312 inch thick casing was placed 180 feet bgs and is seated into medium hard basalt. Torch-cut perforations exist between 150 an 180 feet bgs. A cement grout annular seal extends 59 feet bgs into hard black basalt, and the static water table is 5.5 feet bgs. and sealed with cement grout. The 2002 sanitary survey noted the well lot and well house to be nicely developed. The well house is equipped with a check valve, pressure guage, gate valve, flow meter, and sample tap. The wellhead is located outside of the 100 year floodplain, and the well log indicates that the highest production of water comes from more than 100 feet below static water levels. The annular seal extends into an impermeable unit, however, not all the casing do.

Though the wells may have been in compliance with standards when they were completed, current PWS well construction standards are more stringent. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. These standards include provisions for well screens, pumping tests, and casing thicknesses to name a few. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. An 8-inch casing requires a 0.322 inch thickness and 10-inch casings should be 0.365 inches. As such, the wells were assessed an additional point in the system construction rating.

Spring Construction

Spring construction scores are determined by evaluating whether the spring has been constructed according to Idaho Code (IDAPA 58.01.08.04) and if the spring's water is exposed to any potential contaminants from the time it exits the bedrock to when it enters the distribution system. If the spring's intake structure, infiltration gallery, and housing are located and constructed in such a manner as to be permanent and protect it from all potential contaminants, is contained within a fenced area of at least 100 feet in diameter, and is protected from all surface water by diversions, berms, etc., then Idaho Code is being met and the score will be lower. If the spring's water comes in contact with the open atmosphere before it enters the distribution system, it receives a higher score. Likewise, if the spring's water is piped directly from the bedrock to the distribution system or is collected in a protected spring box without any contact to potential surface-related contaminants, the score is lower.

Stanton Spring rated moderate for construction. The 2002 sanitary survey noted that the spring was redeveloped and significantly upgraded in 1992. A hypochlorinator has been installed to inject chlorine into the spring's water as it leaves the collection box and before it enters the distribution system. The intake structure is constructed of concrete, buried, and secured against a steep hillside, indicating that collected water enters the distribution system without any contact to potential atmospheric contaminants. The sanitary survey shows a waterproof lid with a metal plate as an extra precaution. A moderate rating was received because although the water appears to be collected from a permanent and protected structure, it is unknown if the spring is contained within a fenced area at least 100 feet in diameter, or if the area surrounding the spring is in direct legal control of the City of Kendrick. These conditions are particularly important as the area surrounding the spring was identified as "undetermined agriculture" in DEQ's land use database, and the GWUDI field survey noted cattle near the spring.

Potential Contaminant Source and Land Use

Well #1 rated moderate for IOCs (i.e. nitrates, arsenic), VOCs (i.e. petroleum products), SOCs (i.e. pesticides), and low for microbial contaminants. Well #2 rated low for each potential contaminant category. Well #4 rated low for IOCs, VOCs, and microbial contaminants, and moderate for SOCs. Stanton Spring rated moderate for IOCs, VOCs, SOCs, and low for microbials. The number and location of potential contaminant sources within the delineations contributed to the land use scores.

Final Susceptibility Ranking

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. In this case Well #2 received an automatically high susceptibility due to a road, a storage building, a clothing store, and a carpet store within 50 foot sanitary setback distance of the well, and Well #4 received automatically high susceptibility ratings due to a December 1999 detection of toluene in the well. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and agricultural land contribute greatly to the overall ranking.

Table 5. Summary of City of Kendrick Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	M	M	M	L	M	H	H	H	H
Well #2	H	L	L	L	L	M	H*	H*	H*	H*
Well #4	H	L	L	M	L	M	M	H**	M	M
Stanton Spring	NA	M	M	M	L	M	H	M	H	M

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = Automatic high susceptibility due to road, storage building, clothing store, and carpet store within 50 foot sanitary setback distance of the well.
H = Automatic high susceptibility due detection of toluene (12/99) in the well**
NA = not applicable

Susceptibility Summary

City of Kendrick drinking water system consists of three active groundwater wells and one active spring. The system currently serves approximately 325 people through 211 connections.

In terms of total susceptibility, Well #1 rated high for IOCs, VOCs, SOCs, and microbials. System construction rated moderate and hydrologic sensitivity rated high for the well. Land use rated moderate for IOCs, VOCs, SOCs, and low for microbials.

In terms of total susceptibility, Well #2 rated automatically high for IOCs, VOCs, SOCs, and microbials. System construction rated moderate and hydrologic sensitivity rated high for the well. Land use rated low for IOCs, VOCs, SOCs, and microbials. The automatically high ratings are due to the ground water under direct influence (GWUDI) field survey noting that a road, a storage building, a clothing store, and a carpet store exist within the 50 foot sanitary setback distance of the well.

In terms of total susceptibility, Well #4 rated moderate for IOCs, automatically high for VOCs, and moderate for SOCs and microbials. System construction rated moderate and hydrologic sensitivity rated high for the well. Land use rated low for IOCs and VOCs, moderate for SOCs, and low for microbials.

In terms of total susceptibility, Stanton Spring rated high for IOCs, moderate for VOCs, high for SOCs, and moderate for microbials. System construction rated moderate and land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the City of Kendrick, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. No chemicals should be stored or applied within the 50-foot radius of the wellheads or 100 feet of the spring. As much of the designated protection areas are outside the direct jurisdiction of the City of Kendrick, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection. In addition, the well should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation encompasses urban and commercial land uses. Public education topics could include proper lawn and garden care practices, hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho Stat5ee Department of Agriculture, the Soil Conservation Commission, the Latah Soil and Water Conservation District, and the Natural Resource Conservation Service.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Lewiston Regional DEQ Office (208) 799-4370

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Angie Peterson at the Lewiston Regional DEQ Office, or Melinda Harper, mlharper@idahoruralwater.com, Idaho Rural Water Association, at 208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund≅ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

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Idaho Department of Agriculture, 1998. Unpublished Data.

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Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho Department of Environmental Quality. 1990. Sanitary Survey for City of Kendrick.

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Ralston Hydrologic Services, Inc. 2001. Ground Water and Well Analysis for the City of Bovill, Idaho.

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Rember, W.C., and Bennett, E.H.; 1979. Geologic Map of the Pullman Quadrangle, Idaho, Idaho Bureau of Mines and Geology, Moscow, ID.

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Appendix A

City of Kendrick

Susceptibility Analysis Worksheets

Formulas used to determine Susceptibility Analysis Final Scores

Formula for Well Sources

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility
6 - 12 Moderate Susceptibility
≥ 13 High Susceptibility

Formula for Spring Sources

1. VOC/SOC/IOC/ Final Score = (Potential Contaminant/Land Use X 0.6) + System Construction

2. Microbial Final Score = (Potential Contaminant/Land Use X 1.125) + System Construction

Final Susceptibility Scoring:

0 - 7 Low Susceptibility
8 - 15 Moderate Susceptibility
≥ 16 High Susceptibility

Ground Water Susceptibility Report   Public Water System Name : KENDRICK CITY OF   Well# : WELL #1 SOUTH
Public Water System Number 2290019   10/29/2002 2:35:58 PM

1. System Construction

		SCORE
Drill Date	1960	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	2002
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

3. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	0	2	0

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	YES	4	5	5	4
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	5	5	5	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		12	12	12	8

Potential Contaminant / Land Use - ZONE II

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0

Potential Contaminant / Land Use - ZONE III

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		0	0	0	0

	IOC Score	VOC Score	SOC Score	Microbial Score
Cumulative Potential Contaminant / Land Use Score	17	15	17	8
4. Final Susceptibility Source Score	13	13	13	13
5. Final Well Ranking	High	High	High	High

Ground Water Susceptibility Report   Public Water System Name : KENDRICK CITY OF   Well# : WELL #2 CITY CE

Public Water System Number 2290019   10/29/2002 2:49:14 PM

1. System Construction

		SCORE
Drill Date	unknown	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	2002
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

3. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	0	2	0

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	YES	1	2	2	1
(Score = # Sources X 2) 8 Points Maximum		2	4	4	2
Sources of Class II or III leacheable contaminants or	YES	2	2	2	
4 Points Maximum		2	2	2	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	2	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		6	6	8	2

Potential Contaminant / Land Use - ZONE II

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		0	0	0	0

Potential Contaminant / Land Use - ZONE III

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		0	0	0	0

	IOC Score	VOC Score	SOC Score	Microbial Score
Cumulative Potential Contaminant / Land Use Score	8	6	10	2
4. Final Susceptibility Source Score	12	11	12	11
5. Final Well Ranking	High	High	High	High

1. System Construction

		SCORE
Drill Date	02/17/1998	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	2002
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		3

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	YES	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	0	2	0
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	3	3	1
(Score = # Sources X 2) 8 Points Maximum		2	6	6	2
Sources of Class II or III leacheable contaminants or	YES	3	3	3	
4 Points Maximum		3	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		5	9	9	2
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		0	0	0	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		0	0	0	0
Cumulative Potential Contaminant / Land Use Score		7	9	11	2
4. Final Susceptibility Source Score		10	11	11	10
5. Final Well Ranking		Moderate	High	Moderate	Moderate

Surface Water Susceptibility Report   Public Water System Name : KENDRICK CITY OF   Well# : STANTON SPRING

Public Water System Number 2290019   10/31/2002 1:39:05 PM

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Infiltration gallery or well under the direct influence of Surface Water	YES	0
Total System Construction Score		1

2. Potential Contaminant Source / Land Use

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	1	1	1
(Score = # Sources X 2) 8 Points Maximum		2	2	2	2
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
4 Points Maximum		1	1	1	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	25 to 50% Irrigated Agricultural Land	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		5	5	5	4
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		17	15	17	6
4. Final Susceptibility Source Score		18	10	18	8
5. Final Well Ranking		High	Moderate	High	Moderate